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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 10/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/973,600

Applicant(s)

TABOTA, JUN

Examiner

Thomas M. Dougherty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8. 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

The drawings are objected to because they are too faint. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The description of a bimorph comprising only a single piezoelectric substrate is confusing, since by definition a bimorph constitutes two such substrates or layers.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 5-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Murata et al. (JP 59-057166). Murata shows (fig. 2) an acceleration sensor comprising

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a bimorph type acceleration detection element (2) including a pair of surface acoustic wave resonators (3, 4) coupled to each other with the back surface of one resonator bonded to the back surface of the other resonator, wherein each resonator includes a piezoelectric substrate and a pair of IDT electrodes (fig. 10) are arranged on the front surface of said piezoelectric substrate, wherein said acceleration detection element is supported at and end thereof such that said acceleration detection element is deflected in the thickness direction of the piezoelectric substrate under acceleration, and wherein acceleration is detected by differentially detecting a frequency change or an impedance change of said two surface acoustic wave resonators which is caused by the deflection of the acceleration detection element (see fig. 11). The acceleration sensor further comprising a pair of casing members (6) arranged on two opposed side surfaces of said acceleration detection element facing in a direction in which acceleration is applied, said each casing member (6) having a recess (6b) in the portion thereof at least facing the IDT electrodes and bonded on both ends thereof; and a pair of covering members (7) respectively bonded around the peripheral outline portions thereof to two open surfaces defined by said acceleration element and said casing members (6), wherein said IDT electrodes arranged on said two surface acoustic wave resonators are respectively connected to external electrodes (71-73) arranged on the external surfaces of said covering members (7) via electrodes arranged on the surfaces of said casing members (61-63). The acceleration sensor further comprising (see fig. 8) a pair of casing members (6) respectively arranged on two opposed side surfaces of said acceleration detection element facing in a direction in which acceleration is applied,

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each casing member having a recess in the portion thereof at least facing the IDT electrodes (8b, 9b) and bonded on the entire peripheral outline portion thereof, wherein said IDT electrodes (8b, 9b) arranged on said two surface acoustic wave resonators are connected to terminal electrodes (e.g. 3d, 3e) provided along side edges of said acceleration detection element, said terminal electrodes are respectively connected to external electrodes (61, 62) arranged on the external surfaces of said casing members. Said two surface acoustic wave resonators (3, 4) are oscillated (see fig. 11) at different frequencies (from 30, 31), a difference between the oscillated frequencies is detected (32), and a signal proportional to acceleration is determined ( $V_o$ ) from the frequency difference. Said two surface acoustic wave resonators (3, 4) are oscillated (see fig. 12) at the same frequency (from 34), one of a phase difference and an amplitude difference is obtained from a difference between electric impedances of said two resonators (3, 4), and a signal ( $V_o$ ) is proportional to acceleration is determined from one of the phase difference and the amplitude difference.

Claim 2, as best understood, is rejected under 35 U.S.C. 102(b) as being anticipated by Cullen (US 4,346,597). Cullen shows (figs. 1 and 2) an acceleration sensor comprising an acceleration detection element (12) including two surface acoustic wave resonators (34) including a pair of IDT electrodes arranged on each of the front and back surfaces of said piezoelectric substrate (12), wherein said acceleration detection element (12) is supported at an end thereof such that said acceleration detection element is deflected in the thickness direction of the piezoelectric substrate under acceleration. Note that as Cullen shows the claimed structure this operation is

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inherent, less the Applicants' device does not function as claimed. Fig. 3 shows acceleration being detected differentially (see summing circuit) by detecting a frequency change or an impedance change of said two surface acoustic wave resonators which is caused by the deflection of the acceleration detection element.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al. (JP 4-79419) in view of Watanabe (US 5,838,091). Given the invention of Murata et al. as noted above, they do not explicitly note a glass substrate with a piezoelectric film on it and the IDT on the film. Watanabe notes just such a structure at col. 4, lines 49-66. He doesn't disclose an acceleration sensor and associated circuitry. It would have been obvious to one having ordinary skill in the art to employ the disclosed materials of Watanabe in the device of Murata et al. since glass is a well known, cheap and readily available material for a substrate in a SAW device, and its frequency can be easily adjusted.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cullen (US 4,346,597) in view of Watanabe (US 5,838,091). Given the invention of Cullen as noted above, he does not explicitly note a glass substrate with a piezoelectric film on it

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and the IDT on the film. Watanabe notes just such a structure at col. 4, lines 49-66. He doesn't disclose an acceleration sensor and associated circuitry. It would have been obvious to one having ordinary skill in the art to employ the disclosed materials of Watanabe in the device of Murata et al. since glass is a well known, cheap and readily available material for a substrate in a SAW device, and its frequency can be easily adjusted.

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited shows SAW devices used as accelerometers: Dwyer et al. ('530, ) Schissler ('144), Dwyer et al. ('115). Each shows the claimed structure absent explicit IDTs. Okabe et al. ('906) show surface acoustic wave devices mounted back to back for the purpose of minituarizing a superstructure.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

*tmd*  
tmd

October 29, 2002

*Thomas M. Dougherty*  
THOMAS M. DOUGHERTY  
PRIMARY EXAMINER  
GROUP 2100  
*26.0*